

SECTION 701 CULVERTS & STORM DRAINS

MATERIAL		REFERENCE	PURP.	SAMPLED BY	MIN. FREQ.	MIN. QUANT.	CERT.	SMALL QUANTITY	TYPICAL HANDLING TIME	REMARKS
		TESTED BY		METHOD		CONTAINER	DISTR.			
BACKFILL	Density	701.08 Proj. Engr.	Accept.	Proj. Engr. S 401	1/100 ft/ location/lift/ side or pipe*	-----	-----	-----	-----	*1/3 the pipe height & every 3 feet of backfill thereafter. Per compacted area.
	Density (Non-paved Side Drains)	701.08 Proj. Engr.	Accept.	Proj. Engr. S 401	*	-----	-----	-----	-----	*Visual inspection & compaction to the satisfaction of the engineer with the exception of plastic pipe.
	Granular Material*	701.02 1003.07 Dist. Lab	Accept.	Proj. Engr. S 401	1/1000 yd ³	1 full sample sack	-----	-----	4 days	*pH and resistivity required for metal pipe. Plastic pipe requires granular material.
	Protective Soil Blanket	701.02 Dist. Lab	Accept.	Proj. Engr. S 401	1/1000 yd ³ *	1 full sample sack	-----	300 yd ³	10 days	*Not required if tested & approved as required excavation or borrow pit material.
	Selected Soil*	203.06 701.02 Dist. Lab	Accept.	Proj. Engr. S 401	1/1000 yd ³	1 full sample sack	-----	-----	10 days	*pH and resistivity required for metal pipe. Plastic pipe requires granular material.
	Usable Soil*	701.08 Dist. Lab	Accept.	Proj. Engr. S 401	1/1000 yd ³	1 full sample sack	-----	-----	10 days	*Used only in non-paved side drains except plastic pipe. Plastic pipe requires granular material. pH and resistivity required for metal pipe.
BEDDING MATERIAL		701.02 701.04 1003.08 Proj. Engr.	Accept.	SEE SECTION 726 OF THIS MANUAL.						
CONCRETE PIPE AND PIPE ARCH	Reinforced (All)	701.02 1006 Proj. Engr.	Accept.	Inspected, approved and stamped by Const. Fab. Insp. prior to use.			CD 1 & 6	-----	-----	Visual inspection by Proj. Engr. CD includes test report lab no. for gasket materials.

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		TESTED BY		METHOD		CONTAINER	DISTR.			
CONCRETE PIPE AND PIPE ARCH (Cont'd)	Non-Reinforced	701.02 1006.02 Mfr. & Const. Fab. Insp.	Prelim. Source Approval	Const. Fab. Insp. S 601	1/160 joints/size	1 joint	----	----	----	Three-edge-bearing test. Each joint shall be stamped when approved.
		701.02 1006.02 Proj. Engr.	Accept.	Inspected, approved and stamped by Const. Fab. Insp. prior to use.			CD 1 & 6	----	----	Visual inspection by Proj. Engr. CD includes test report lab no. for gasket materials.
	Reinforced (Less than 36 in. Diameter)	701.02 1006.03 1006.04 Mfr. & Const. Fab. Insp.	Prelim. Source Approval	Const. Fab. Insp. S 601	1/160 joints/size	1 joint	----	----	----	Three-edge-bearing test. Includes concrete pipe arch. Each joint shall be stamped when approved.
	Reinforced (36 in. Diameter and Larger)	701.02 1006.03 1006.04 Mfr. & Const. Fab. Insp. or Dist. Lab	Prelim. Source Approval	Const. Fab Insp. S 301 S 601	1/160 joints/size or 4 cyl/160 joints/size or 3 consecutive days production/size*	1 joint or 4 cyl 6 in. x 12 in. cylinder mold	-----	-----	-----	Three-edge-bearing test or compressive strength test. Includes concrete pipe arch. *Shall not exceed 160 joints. The use of 6 in. x 12 in. compressive strength cylinders for acceptance shall be at the discretion of the Const. Fab. Insp. Unit. Each joint shall be stamped when approved.
	Reinforced (Circular with Elliptical Reinforcement)	701.02 1006.03 1006.04 Mfr. & Const. Fab. Insp. or Dist. Lab	Prelim. Source Approval	Const. Fab. Insp. S 301 S 601	1/160 joints/size or 4 cyl/160 joints/size or 3 consecutive days production/size*	1 joint or 4 cyl 6 in. x 12 in. cylinder mold	-----	-----	-----	Three-edge-bearing test or compressive strength test. The placement of elliptical reinforcement must be approved by the Const. Fab. Insp. Unit. Each joint shall be stamped when approved. *Shall not exceed 160 joints.

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		TESTED BY		METHOD		CONTAINER	DISTR.			
CONCRETE PIPE AND PIPE ARCH (Cont'd)	Absorption Test	701.02 1006.03 1006.04 Const. Fab. Insp.	Accept.	Const. Fab. Insp. S 601	*	-----	-----	-----	-----	*This test will be conducted at the discretion of the Const. Fab. Insp. Unit in cases where the pipe exhibits visual porosity.
	Admixtures	701.02 1011.02 Mat. Lab	Accept.	Const. Fab. Insp. S 601	1/type/ mfr./batch	1 pt Friction top can	-----	-----	14 days	(QPL 58)
	Cement for Concrete Pipe	701.02 1001 Mat. Lab	Accept.*	Const. Fab. Insp. S 102	**	1 gal Friction top can**	CD 6 & 7	-----	16 days	(QPL 7) *See Section 901 of this manual. **Visual inspection by Const. Fab. Insp. Unit. Sample only if questionable.
	Coarse & Fine Aggregate for Concrete Pipe	701.02 1003.02 Mat. Lab	Accept.	Const. Fab. Insp. S 101	*	1 full sample sack	-----	-----	-----	*Visual inspection by Const. Fab. Insp. Unit. Sample only if questionable.
	Hydrostatic Test	701.02 1006 Const. Fab. Insp.	This test shall be used as a basis for source approval of new joint designs and repairs and for evaluation of new products such as gasket materials, etc.				-----	-----	-----	Test shall be performed in accordance with AASHTO M 198. Also, applicable to Section 1007, Metal Pipe.
	Mix Design	701.02 1006 Const. Fab. Insp.	Design/ Accept.	Mfr. ASTM C 76	1/plant/ source	-----	-----	-----	-----	Portland cement concrete pipe shall be manufactured and controlled in accordance with ASTM C 76.
	Permeability Test	701.02 1006 Const. Fab. Insp.	Accept.	Const. Fab. Insp.	*	1 joint	-----	-----	-----	One pipe per lot of sizes up to and including 48 in. in diameter. *This test will be conducted at the discretion of the Const. Fab. Insp. Unit in cases where the pipe exhibits visual porosity.
	Reinforcing Steel for Concrete Pipe	701.02 1009 Mat. Lab	Accept.	Const. Fab. Insp. S 501	1/6 month/ source	48 in. x 48 in.	-----	-----	10 days	(QPL 71) Sample shall include an area which will have the welded splice at approximately the midpoint.

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CONCRETE PIPE AND PIPE ARCH (Cont'd)	Water	1018.01 Mat. Lab	Accept.	Const. Fab. Insp. S 303	1/source*	1 qt Plastic bottle	-----	-----	11 days	*Drinkable water need not be sampled.
CONDUIT PLUG & COLLARS	Concrete (Class R)	701.10 Proj. Engr.	Accept.	SEE SECTION 901 OF THIS MANUAL.						
GASKET MATERIAL (For Pipe)	Flexible Plastic Gasket	701.02 1006.06(b) Mat. Lab	Prelim. Source Approval	Const. Fab. Insp. S 601	1/size/batch/shipment	3 ft length	-----	-----	21 days	(QPL 4)
		701.02 1006.06(b) Mat. Lab	Accept.	Inspected and approved by Const. Fab. Insp. prior to use.			CD 1 & 6	-----	11 days	(QPL 4) Visual inspection by the Proj. Engr. Sample only if questionable. Gasket test report lab no. listed on pipe CD. Primer used according to gasket manufacturer's recommendation; sample not required.
	Rubber Gaskets	701.02 1006.06(a) Mat. Lab	Prelim. Source Approval	Const. Fab. Insp. S 601	1/size/batch/shipment	1 gasket	-----	-----	21 days	(QPL 4)
		701.02 1006.06(a) Mat. Lab	Accept.	Inspected and approved by Const. Fab. Insp. prior to use.			CD 1 & 6	-----	17 days	(QPL 4) Visual inspection by the Proj. Engr. Sample only if questionable. Gasket test report lab no. listed on pipe CD. Lubricant used according to gasket manufacturer's recommendation; sample not required.
	GEOTEXTILE FABRIC	701.02 1019.01 Mat. Lab	Prelim. Source Approval	Dist. Lab S 614	1/type/lot/source/shipment	3 lin ft/roll width of fabric*	-----	-----	7 weeks	* Sample a minimum of 18 ft ² .
		701.02 1019.01 Mat. Lab	Accept.	Proj. Engr. S 601	1/type/source/shipment	3 lin ft/roll width of fabric*	CD** 1 & 7	150 yd ²	11 days	(QPL 61) *Sample a minimum of 18 ft ² . **Sample when not accompanied by CD or questionable.

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		TESTED BY		METHOD		CONTAINER	DISTR.			
METAL PIPE		1007 Mat. Lab	Prelim. Source Approval	Const. Fab. Insp.	1/size/gage/ 200 lin ft	1 - 3 in. triangle	-----	-----	-----	Connecting bands for metal pipe shall be inspected, approved and the pipe lab no. painted on the band and in the pipe by Const. Fab. Insp.
	Bituminous Coated Corrug. Steel Pipe & Pipe Arch	701.02 1007.02 Mat. Lab	Accept.	Inspected, approved and marked by Const. Fab. Insp. prior to use.			CD 1 & 6	-----	10 days	Visual inspection by Proj. Engr. CD includes gage, diameter, coupling bands, gasket materials and hardware.
	Corrug. Aluminum Pipe & Pipe Arch	701.02 1007.06 Mat. Lab	Accept.	Inspected, approved and marked by Const. Fab. Insp. Prior to use.			CD 1 & 6	-----	11 days	Visual inspection by Proj. Engr. CD includes gage, diameter, coupling bands, gasket materials and hardware.
	Fiber Bonded Bituminous Coated Corrug. Steel Pipe & Pipe Arch	701.02 1007.03 Mat. Lab	Accept.	Inspected, approved and marked by Const. Fab. Insp. prior to use.			CD 1 & 6	-----	10 days	Visual inspection by Proj. Engr. CD includes gage, diameter, coupling bands, gasket materials and hardware.
	Polymer Coated Corrug. Steel or Aluminum Pipe & Pipe Arch	701.02 1007.08 Mat. Lab	Accept.	Inspected, approved and marked by Const. Fab. Insp. prior to use.			CD 1 & 6	-----	11 days	(QPL 43) Visual inspection by Proj. Engr. CD includes gage, diameter, coupling bands, gasket materials, hardware and repair compounds.
	Structural Plate Pipe & Pipe Arch	701.02 1007.05 Mat. Lab	Accept.	Inspected, approved and marked by Const. Fab. Insp. prior to use.			CD 1 & 6	-----	11 days	Visual inspection by Proj. Engr. CD includes gage, diameter, coupling bands, gasket materials and hardware.
	Bituminous Material for Metal Pipe	1007.02 Mat. Lab	Prelim. Source Approval	Const. Fab. Insp. S 601	*	1 qt Friction top can	CC	-----	-----	*Visual inspection by Const. Fab. Insp. Sample only if questionable.
	Galvanizing Repair Compound	1007.01 1007.08 Mat. Lab	Accept.	Const. Fab. Insp. S 601	1/type*	1 can	-----	-----	10 days	(QPL 23) *Visual inspection by Constr. Fab. Insp. Sample only if questionable.

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METAL PIPE (Cont'd)	Hardware	1007.10(d) Mat. Lab	Prelim. Source Approval	Const. Fab. Insp. S 601	1/source/shipment	1 of each item*	-----	-----	9 days	Visual inspection by Constr. Fab. Insp. Sample only if questionable. Includes steel rods, lugs, bolts and nuts. *One of each type of hardware used is to be submitted.
	Polymer Repair Compound	1007.08(e) Mat. Lab	Accept.	Const. Fab. Insp.	-----	-----	-----	-----	9 days	(QPL 43) Sample only if questionable.
	Steel Coils for Metal Pipe	701.02 1007 Const. Fab. Insp.	Accept.	Const. Fab. Insp.	-----	-----	CA 6	-----	-----	Const. Fab. Insp. reviews CA for acceptance.
MORTAR	Cement, Sand & Water	701.02 702.02 Proj. Engr.	Accept.	-----	-----	-----	-----	-----	-----	Visual inspection by Proj. Engr. Sample only if questionable.
PLASTIC CULVERT PIPE		701.02 1006.07 Mat. Lab	Prelim. Source Approval	Const. Fab. Insp.	1/size/lot	1 - 3 in. triangle	CA	-----	-----	(QPL 66)
		701.02 1006.07 Mat. Lab	Accept.	Inspected and approved by Const. Fab. Insp. prior to use.			CA & CD* 1 & 6	-----	-----	(QPL 66) Visual inspection by Proj. Engr. CD includes split coupling bands, straps and gasket material. *In lieu of CD a letter from Const. Fab. Insp. to Proj. Engr. shall suffice.
	Mandrel Test	701.09(a) Contractor	Accept.	Contractor	1/line of pipe	-----	-----	-----	-----	For 36 in. diameter or less. Proj. Engr. to observe and approve.
PLASTIC YARD DRAIN PIPE & JOINTS		701.02 1006.09 Mat. Lab	Accept.	Proj. Engr. S 601	1/type/size/shipment*	6 ft length or 1 item	CC 3	-----	10 days	*Sample fittings & gasket material 1 per type per shipment.